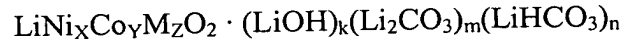


Claims

1. A positive electrode material for a lithium-ion or lithium-ion polymer battery, having the formula



wherein M is one or more transition metals different than Ni and Co, $X+Y+Z=1$,

- 5 $X \geq Y$, $Z < 0.5$, $0.001 < k+m+n < 0.3$, and $k+n < 0.1m$.

2. The positive electrode material of claim 1 wherein $k+n < 0.01m$.
3. The positive electrode material of claim 1 wherein $k+n < 0.001m$.
4. The positive electrode material of claim 1 wherein $Y=0$.
5. The positive electrode material of claim 4 wherein $k+n < 0.01m$.
6. The positive electrode material of claim 4 wherein $k+n < 0.001m$.
7. The positive electrode material of claim 1 prepared by exposing the positive electrode material at a temperature of 0-650°C to a CO₂-containing gas having a partial pressure of CO₂ in the range of 0.0001-100 atm to convert LiOH to Li₂CO₃.

8. The positive electrode material of claim 7 further prepared by heating the positive electrode material to a temperature of at least 250°C in the presence of an oxygen-containing gas having a partial pressure of O₂ in the range of 0.01-99 atm to convert LiHCO₃ to Li₂CO₃.

9. The positive electrode material of claim 1 prepared by heating the positive electrode material to a temperature of at least 250°C in the presence of an oxygen-containing gas having a partial pressure of O₂ in the range of 0.01-99 atm to convert LiHCO₃ to Li₂CO₃.

10. The positive electrode material of claim 1 prepared by heating the positive electrode material to a temperature of 250-500°C in the presence of an oxygen-containing gas having a partial pressure of O₂ in the range of 0.01-99 atm to convert LiHCO₃ to Li₂CO₃ and in the presence of a CO₂-containing gas having a partial pressure of CO₂ in the range of 0.0001-100 atm to convert LiOH to Li₂CO₃.

11. A lithium ion battery comprising a positive electrode material of the formula



wherein M is one or more transition metals different than Ni and Co, X+Y+Z=1,

5 X≥Y, Z<0.5, 0.001<k+m+n<0.3, and k+n<0.1m.

12. The lithium ion battery of claim 11 wherein $k+n < 0.01m$.
13. The lithium ion battery of claim 11 wherein $k+n < 0.001m$.
14. The lithium ion battery of claim 11 wherein $Y=0$.
15. The lithium ion battery of claim 14 wherein $k+n < 0.01m$.
16. The lithium ion battery of claim 14 wherein $k+n < 0.001m$.
17. The lithium ion battery of claim 11 wherein the positive electrode material is prepared by exposing the positive electrode material at a temperature of $0-650^{\circ}\text{C}$ to a CO_2 -containing gas having a partial pressure of CO_2 in the range of $0.0001-100$ atm to convert LiOH to Li_2CO_3 .
18. The lithium ion battery of claim 17 wherein the positive electrode material is further prepared by heating the positive electrode material to a temperature of at least 250°C in the presence of an oxygen-containing gas having a partial pressure of O_2 in the range of $0.01-99$ atm to convert LiHCO_3 to Li_2CO_3 .

19. The lithium ion battery of claim 11 wherein the positive electrode material is prepared by heating the positive electrode material to a temperature of at least 250°C in the presence of an oxygen-containing gas having a partial pressure of O₂ in the range of 0.01-99 atm to convert LiHCO₃ to Li₂CO₃.

20. The lithium ion battery of claim 11 wherein the positive electrode material is prepared by heating the positive electrode material to a temperature of 250-500°C in the presence of an oxygen-containing gas having a partial pressure of O₂ in the range of 0.01-99 atm to convert LiHCO₃ to Li₂CO₃ and in the presence of a CO₂-containing gas having a partial pressure of CO₂ in the range of 0.0001-100 atm to convert LiOH to Li₂CO₃.